

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE					
1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b RESTRICTIVE MARKINGS	2a SECURITY CLASSIFICATION AUTHORITY		2b DECLASSIFICATION/DOWNGRADING SCHEDULE
3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.				4 PERFORMING ORGANIZATION REPORT NUMBER(S) NPRDC TR 85-12	
				5 MONITORING ORGANIZATION REPORT NUMBER(S)	
6a NAME OF PERFORMING ORGANIZATION Navy Personnel Research and Development Center				6b OFFICE SYMBOL (if applicable) Code 06	
6c ADDRESS (City, State and ZIP Code) San Diego, Ca 92152-6800		7a NAME OF MONITORING ORGANIZATION		7b ADDRESS (City, State and ZIP Code)	
8a NAME OF FUNDING/SPONSORING ORGANIZATION Deputy Chief of Naval Operations (Manpower, Personnel, and Training)			8b OFFICE SYMBOL (if applicable) OP-01	8c ADDRESS (City, State and ZIP Code) Navy Annex, Washington, DC 20350	
9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	10 SOURCE OF FUNDING NUMBERS				
	PROGRAM ELEMENT NO 63707N		PROJECT NO Z1187-PN		WORK UNIT NO .02
11 TITLE (Include Security Classification) NAVY MEDICAL OFFICER RETENTION BEHAVIOR					
12 PERSONAL AUTHOR(S) Mullins, Carol M.					
13a TYPE OF REPORT Interim		13b TIME COVERED FROM Feb 83 TO Feb 84		14 DATE OF REPORT (Year, Month, Day) 1984 December	15. PAGE COUNT 18
16 SUPPLEMENTARY NOTATION					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
05	09		Medical officers, special pays, retention forecasting, officer manpower planning		
19 ABSTRACT (Continue on reverse if necessary and identify by block number) This report describes the development of an econometric model for explaining some of the factors contributing to the retention decision of Navy medical officers. Key factors found to influence loss behavior include medical specialty, source of entry, and pay, among others. Data sources are covered, and data deficiencies that limited model development are highlighted.					
20 DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> OTC USERS			21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
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DD FORM 1473, 84 JAN

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NPRDC TR 85-12

DECEMBER 1984

NAVY MEDICAL OFFICER RETENTION BEHAVIOR

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**NAVY PERSONNEL RESEARCH
AND
DEVELOPMENT CENTER
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NAVY MEDICAL OFFICER RETENTION BEHAVIOR

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FOREWORD

This research and development was conducted in response to Navy decision coordinating paper Z1187-PN (Computer-based Manpower Planning and Programming) under subproject PN.02 (Officer Personnel Management Models) and the sponsorship of the Deputy Chief of Naval Operations (Manpower, Personnel, and Training) (OP-01). The objective of the subproject is to develop a set of user-oriented, computer-based models and data bases to assist in the development of a Navy officer force that meets its requirements for manpower.

This report describes an effort to identify and measure factors that contribute to the retention decision of Navy medical officers. Results will lead to a better understanding of the role of incentive pays in retaining physicians. Results are intended for Navy manpower managers and researchers concerned with successful force management. Appreciation is expressed to LT T. Miller (NAVMEDCOM-513) for assistance in data collection.

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SUMMARY

Problem

Accurate loss forecasting is particularly important in critical skill areas. The Navy has invested substantial sums of money to attract, train, and retain personnel with these skills. An example is the Navy's medical officer community. Many physicians receive some financial assistance toward their education in return for services. Physicians' postgraduate education is often subsidized. In addition, physicians are eligible to receive up to \$29,000 per year in continuation incentives. In FY83, the Navy spent \$59.2 million alone on physician incentive pays. To assess the contribution of special incentive pays to medical officer retention, it is critical to identify and measure the significance of other factors affecting retention.

Objective

The objective of this effort was to develop a model that identifies factors that significantly affect the likelihood of a physician leaving the Navy.

Approach

An econometric model was developed and estimated using LOGIT, a nonlinear estimation technique. The model was designed to examine the effect that a variety of variables, both qualitative and quantitative, have on the probability of a physician leaving the Navy in FY82. The data used in this effort were obtained from the June 1983 Medical Officer File (MOF). Because the MOF contains only cross-section data, variables that fluctuate over time rather than across the force could not be included in the model. Additionally, the Officer Master File (OMF) was examined as a possible source of data. However, data elements relevant to the medical community were found to contain incomplete data or were altogether empty. The model estimated was explanatory only; it could not be used currently for retention forecasting because it lacked important time-dependent variables and historical data necessary for validation.

Findings

1. A physician's specialty is a key indicator of the likelihood of staying in the Navy. Psychiatrists are more likely to stay in the Navy than physicians in any other specialty. Estimation results indicate that physicians with a general medicine specialty are the most likely to leave the Navy.
2. Medical officer retention also differed across source of entry program. Having entered under the Early Commissioning programs or the Berry Plan increased the likelihood of a physician leaving the Navy in FY82.
3. An officer's location in the career path affects the likelihood that he or she will leave the Navy. Physicians who are eligible to retire and those who are within one year of being free of obligation are more likely to leave the Navy than physicians who are not at either of these decision points.
4. Factors that were found to decrease the likelihood of a physician leaving include being a foreign medical school graduate, holding additional medical related qualifications (e.g., flight surgeon qualified), and being a regular Navy officer.

Conclusions

Current research on medical officer retention will be constrained by the limited volume and quality of Medical Corps personnel data. For example, the MOF, the most complete data currently available, contains only cross-sectional or "snapshot" data for 2 fiscal years. Such data do not permit the developing and testing of loss forecasting models. In addition, the lack of special pays data specific to individuals increases the likelihood of overestimating the contribution of physician compensation.

Recommendations

1. Because the civilian market for physicians is well defined and job opportunities are widely publicized, consideration should be given to developing measures of civilian opportunity for inclusion in subsequent models.

2. Further research may suggest some specification of total military compensation that might allow the true effect of military compensation on the probability of leaving the Navy to be measured. Maintenance of the MOF in a manner such that it can be used as a source of time-series data would go a long way toward the realization of a loss forecasting model for the Navy's medical officer community. With suitable historical data, a loss forecasting model for physicians that includes civilian market opportunities, civilian and military physician income, and other factors that fluctuate over time might be developed. It is expected that such a model will provide more accurate loss forecasts than those currently available.

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INTRODUCTION

Background

In military manpower systems, most personnel flows are initiated by the creation of vacancies within the system. Vacancies are largely the result of losses. Losses in the pay grade hierarchy trigger promotions from lower grades. Vacancies also generate a need for new accessions to replenish or expand the force. Thus, accession and promotion plans, as well as manpower budgeting, are dependent on accurate loss forecasts. An underestimate of losses can lead to too few accessions, too few promotions, erroneous budget projections, and ultimately, a readiness problem. In contrast, an overestimate can cause too many accessions, delays in promotions, and potential budget overruns.

The importance of accurate loss forecasting is magnified in critical skill areas. The Navy has sustained substantial investment costs to attract, train, and retain these personnel. Replacement costs are high. Knowledge of the rate at which these personnel will attrite under alternative personnel programs (e.g., compensation) and exogenous events is vital to manpower managers. An example of such a group is the Navy's medical officer community.

The Navy incurs a sizable "agricultural" expense in the acquisition and training of physicians. An increasing number of doctors are produced in in-service medical schools or receive some financial assistance in return for service. In addition, physicians' post-graduate training is often subsidized by the Navy. A more noticeable expense is the array of continuation incentives. Each physician, regardless of experience or specialty, earns variable special pay (an annual salary increment). Some physicians may be entitled to as many as four special pays up to a maximum of \$29,000 per year. An expenditure of this magnitude has drawn the attention of the Navy, Department of Defense, and Congress. All are concerned whether special pays are effective incentives for attracting and retaining physicians.

Problem

To understand the role of special pays, it is important to identify and measure the contribution that many factors, both economic and noneconomic, make to the decision to stay in or leave the Navy. The effort to understand and forecast medical officer losses was severely constrained by limitations in the available data. The work examined the relationship between a variety of factors and the loss behavior of Navy physicians during FY82 only. The model developed in this effort is simply explanatory. It serves only to identify some of the factors that contribute to attrition. Factors that required historical trend data to assess (e.g., civilian employment conditions) were omitted. The deficiencies in useful historical data also prevented the construction and validation of a loss forecasting model. (The data limitations and their implications are described in more detail in Model Specifications and Data.)

Characteristics of the FY82 Physician Population

Each Navy physician, regardless of time in service, is classified by specialty (e.g., surgeon, pediatrician, general practitioner). Although there is an organizational hierarchy within each specialty--in training, fully trained, and board certified--only the aggregation was employed in this effort. Table 1 illustrates the specialty distribution of Navy physicians at the outset of FY82.

Table 1
Distribution of Physicians by Specialty, Beginning of FY82
(N = 3,589)

Specialty	N	%
General medicine	756	21.06
Surgeon	556	15.49
Other ^a	492	13.71
Internal medicine	466	12.98
Family practice	298	8.30
Pediatrics	264	7.36
Radiology	193	5.38
Obstetrics/Gynecology	188	5.24
Anesthesiology	164	4.57
Psychiatry	139	3.87
Unknown ^b	73	2.03

Note. Data taken from Navy Medical Officer File (MOF), June 1983.

^aIncludes pathology, preventive medicine, and other less populated specialties.

^bNo specialty indicated on the MOF.

Unlike most Navy officer communities, physicians receive credit toward total military service for time spent in medical school, an internship, residency training, and even civilian practice. The Navy awards 4 years of constructive credit for the completion of medical school, 1 year for the completion of an internship, and year-for-year credit for time spent in residency training. Physicians who have been practicing medicine in the private sector prior to entering the Navy receive 1/2 year of credit for each year of private practice. The total amount of creditable service cannot exceed 14 years, and most doctors enter with at least 4 years of service. Those entering with between 4 and 9 years of creditable service are commissioned as lieutenants (O-3), while those with between 10 and 14 years are made lieutenant commanders (O-4). Table 2 provides a force structure matrix, arraying the medical community (as it appeared at the outset of FY82) by pay grade and length of service (LOS).

Most physicians are commissioned through a number of entry programs unique to the medical community. Some of these programs have terminated (e.g., the Berry Plan). Others, such as the Armed Forces Health Profession Scholarship Program (AFHPSP), are relatively new. Table 3 depicts the FY82 medical community inventory arrayed by source of entry and LOS. It indicates that the AFHPSP is the primary source of entry of the more junior physicians, while the Volunteer and Early Commissioning programs are the primary sources of entry of more senior physicians.

Table 2

Distribution of Physicians by Length of Service (LOS)
and Pay Grade, Beginning of FY82

LOS (Years)	Pay Grade							Total
	O-1	O-2	O-3	O-4	O-5	O-6	O-7	
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	--	--	25	--	--	--	--	25
5	--	--	285	--	--	--	--	285
6	--	--	377	--	--	--	--	377
7	--	--	384	--	--	--	--	384
8	--	--	332	--	--	--	--	332
9	--	--	83	178	--	--	--	261
10	--	--	2	171	--	--	--	173
11	--	--	1	299	--	--	--	300
12	--	--	1	162	--	--	--	163
13	--	--	1	121	--	--	--	122
14	--	--	--	66	17	--	--	83
15	--	--	--	12	28	--	--	40
16	--	--	--	1	211	--	--	212
17	--	--	--	2	107	--	--	109
18	--	--	--	1	49	--	--	50
19	--	--	--	2	26	--	--	28
20	--	--	--	1	6	--	--	7
21	--	--	--	--	35	1	--	36
22	--	--	--	--	29	105	--	134
23	--	--	--	--	10	49	--	59
24	--	--	--	--	5	68	--	73
25	--	--	--	--	1	48	--	49
26	--	--	--	--	3	40	--	43
27	--	--	--	--	--	33	--	33
28	--	--	--	1	--	8	--	9
29	--	--	--	--	--	24	--	24
30	--	--	--	--	1	110	--	111
Unknown	--	--	--	--	--	--	14	14
Total	--	--	1,491	1,017	528	486	14	3,536

Note. Data taken from the end FY81 Officer Master File (OMF).

Table 3

Distribution of Physicians by LOS and Source of Entry, Beginning of FY82
(N = 3,589)

LOS (Years)	Source of Entry							Unknown
	AFHPSP ^a	BP ^b	EC ^c	MOSSP ^d	USUHS ^e	VOL ^f	Other	
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	1	--	--	--	14	--	--	7
4	125	--	--	5	11	10	--	98
5	198	--	--	--	2	8	--	51
6	186	--	--	7	1	22	1	63
7	200	--	4	24	4	37	--	78
8	174	--	2	21	--	24	--	55
9	172	--	3	38	2	61	1	66
10	37	--	--	7	--	8	--	8
11	106	--	9	57	--	77	--	37
12	8	--	34	34	--	64	--	24
13	2	3	8	13	--	72	--	18
14	1	6	12	5	--	38	--	4
15	--	2	--	--	--	11	--	3
16	1	31	56	41	--	104	3	36
17	--	13	34	4	--	41	6	16
18	1	3	23	--	--	19	2	6
19	--	4	5	--	--	17	1	2
20	--	7	14	--	--	12	--	1
21	--	3	7	--	--	8	1	3
22	--	20	52	--	--	33	3	16
23	--	2	37	--	--	12	--	4
24	--	8	34	--	--	21	2	8
25	--	1	23	--	--	19	1	7
26	--	4	24	--	--	10	3	1
27	--	3	17	--	--	8	--	5
28	--	2	3	--	--	3	--	1
29	--	6	8	--	--	9	--	1
30	--	18	7	--	--	62	10	14
Unknown	7	1	5	--	2	22	2	19
Total	1,219	137	421	256	36	832	36	652

Notes. Inventory in this table is inconsistent with the inventory shown in Table 2 for two reasons:

1. Data shown in this table were obtained from the MOF. The MOF and OMF (source for Table 2) are created and maintained by different organizations. There is little attempt made to guarantee their consistency.

2. Fields on the MOF containing information on source of entry program and/or year group are blank for 691 physicians.

^aAFHPSP--Armed Forces Health Professions Scholarship Program.

^bBP--Berry Plan.

^cEC--Early Commissioning Program.

^dMOSSP--Medical and Osteopathic Student Scholarship Program.

^eUSUHS--Uniformed Services University of Health Sciences.

^fVOL--Volunteer Programs.

During FY82, Navy physicians were eligible for four types of special pays--variable special pay, additional special pay, incentive special pay, and board certified pay. With the exception of incentive special pay, all depend on a physician's LOS. Variable special pay (VSP) is paid to each Navy physician, including those in internship training programs. VSP amounts range from \$1,200 per year for those in training to \$10,000 per year for physicians with more than 6 but less than 8 years of service. Doctors who agree to remain in the Navy for an additional year are eligible to receive additional special pay (ASP). A physician with less than 10 years of service receives a lump sum payment of \$9,000. All others receive \$10,000. Physicians who have attained board certification in a medical specialty receive board certified pay (BCP) in amounts ranging from \$2,000 per year for physicians with less than 10 years of service to \$5,000 per year for doctors with at least 18 years of service. Even physicians who practice in a specialty in which board certification is not available can receive BCP by attaining board certification equivalency. Finally, incentive special pay (ISP) is dependent solely on a physician's specialty. ISP is paid to physicians who agree to remain on active duty for at least an additional year and, also, are qualified in a specialty in short supply. During FY82, ISPs ranged from \$4,000 per year for preventive medicine physicians to \$7,000 for surgeons.

APPROACH

Model Specifications and Data

The explanatory model developed here was estimated using the LOGIT nonlinear estimation technique. This technique was chosen because the dependent variable, the probability of a physician leaving the Navy in FY82, is restricted to values between 0 and 1. The model was designed to examine the effect that a variety of variables have on the probability of a physician leaving the Navy in FY82. The majority of variables included in the model are limited to a pair of values. They are restricted to values of 1 implying that the conditions holds, or 0 if it does not. The retirement eligible variable is an example. Either a physician is or is not eligible to retire. The pay variable is quantitative and carries no such value restrictions. It captures the effect of the size of military pay on the probability of leaving. Table 4 lists the variables considered in this model.

The data used in this effort were obtained from the June 1983 Medical Officer File (MOF). The file contains individual data on each physician currently serving on active duty, physicians who have left the Navy, and pending physician gains. Maintained on the file is general information on a physician's military career, as well as specific information related to his medical training and specialty. In order to obtain a FY82 beginning inventory, the data were processed in the following manner: First, all physicians who entered the Navy during or prior to September 1981 as indicated by their active commission base date were selected. From this population, those physicians who left the Navy before 1 October 1981 were deleted. Estimated lost data (ELD) was used to eliminate those who were not on active duty. The remaining individuals represent the medical community beginning inventory for FY82. ELD was also used to determine which physicians who were included in the FY82 beginning inventory left during FY82--ELD between 1 October 1981 and 30 September 1982. These physicians represent FY82 medical community losses.

Table 4
Variables Included in the Model

Specialty

Anesthesiology
Family practice
General medicine
Internal medicine
Obstetrics/Gynecology
Pediatrics
Psychiatry
Radiology
Surgery

Source of Entry Program

Armed Forces Health Professions Scholarship Program
Berry Plan
Early Commissioning Program
Medical and Osteopathic Students Scholarship Program
Volunteer Programs

Other

Able to retire in FY82
Foreign medical school graduate
Hold additional qualifications
Obligation expires in FY82
Pay^a
Regular Navy officer

^a Measures actual pay amount. All other variables equal 1 if the condition is true, and 0 otherwise.

Frequently, research work is constrained by the available data. This effort is an example. Two data deficiencies deserve mention. The estimated model was limited to cross-section data. Currently, time-series (historical) data specific to the medical community have not been maintained. Information on each naval officer (including physicians) is maintained historically on the Officer Master File (OMF). However, examination of FY82 physician records extracted from the OMF indicate serious shortcomings. Fields relevant to the medical community are particularly lacking: Over 24 percent of the physicians have no specialty indicator and over 20 percent have no indicator of training status. Both of these are critical in determining special pays, as well as being important indicators of continuance in their own right. Also, the OMF lacks fields for source of entry, obligated service date, and location of highest educational institution attended (medical school). All three were found to be important in explaining loss behavior of physicians. These limitations in the OMF were believed to be serious enough to preclude its use as a source of medical community historical data.

The shortcomings of the available time-series data prevented assessment of the importance of variables that fluctuate over time, rather than across the force. Examples include private sector physician labor market conditions, and civilian and military pay. Since these variables are generally thought to be significant factors in affecting and controlling retention, without them a forecasting model is currently not feasible. Moreover, without time-series data, a fair test of a model's forecast validity cannot be accomplished.

In addition, the MOF maintains no individual specific data on current special pays. Consequently, the physician's total military compensation was estimated by inferring special pay values. The resulting compensation figure represents the maximum amount that each physician could receive based on specialty, pay grade, and length of service. In some instances, this figure may significantly exceed the amount that the physician is actually earning.

FINDINGS

Estimation Results

Results from the estimation of the model suggest that a physician's specialty is a key indicator of the likelihood of staying in the Navy. A comparison group composed of preventive medicine, pathology, and other less populated specialties was formed. It was against this group that the magnitude of the effect of a physician's specialty on the likelihood of leaving the Navy was measured. Relative to a physician in the comparison group, a physician in any other specialty was, with a single exception, less likely to leave the Navy. Figure 1 depicts the effect of specialty on loss behavior. The size of the effect is of particular interest. Psychiatrists are more likely to stay in the Navy than any of their counterparts in other specialties. The general medicine specialty is composed primarily of physicians who have completed an internship but not a residency or who are relatively junior officers. Since individuals with few years of service tend to leave with greater frequency, the increased likelihood of physicians in this specialty leaving the Navy is not surprising.

Studies of other officer community retention have found that source of entry is a key indicator of retention. Figure 2 shows the effect that source of entry programs have on the likelihood of a physician leaving the Navy. Once again a comparison group is used. It is composed of individuals who entered the Navy under the Uniformed Services University of Health Sciences (USUHS) program or other miscellaneous programs. Entering the Navy under any other source of entry program increased the probability that a physician will leave the Navy relative to a physician from the comparison group. Given that the control group is composed primarily of USUHS graduates who were all serving under an obligation during the period of this investigation, this result is not unexpected. The source of entry program that has the greatest effect on the likelihood of a physician leaving the Navy is the Early Commissioning program. This is followed closely by the Berry Plan. The initiation and cessation of several of the source of entry programs has led to officers from these sources being confined to limited segments of the LOS distribution. Both the Early Commissioning and Berry Plan programs have been terminated. By FY82, physicians who entered under these programs were in LOS cells where resignations and retirement losses are typically high--early teens and early twenties.

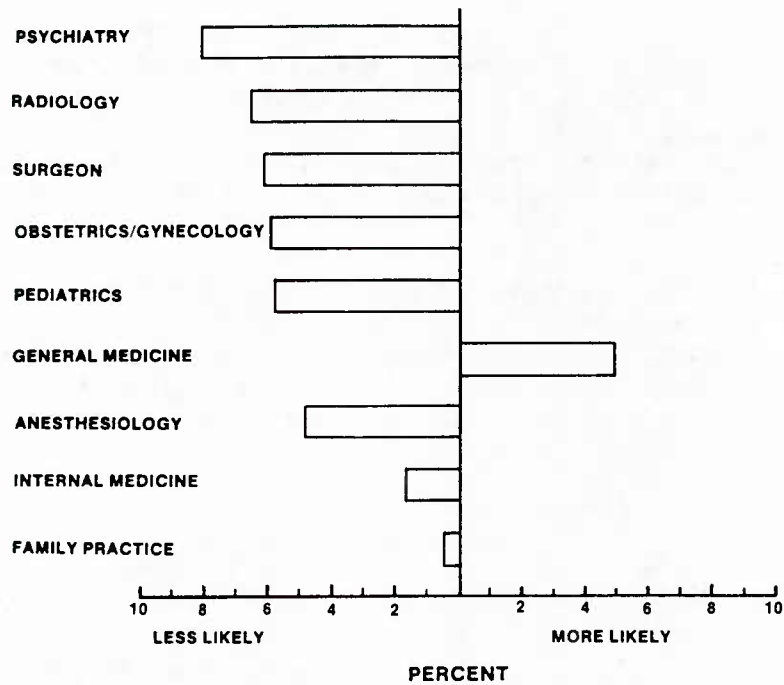


Figure 1. Likelihood of physicians in selected medical specialties leaving the Navy relative to a comparison group, FY82.

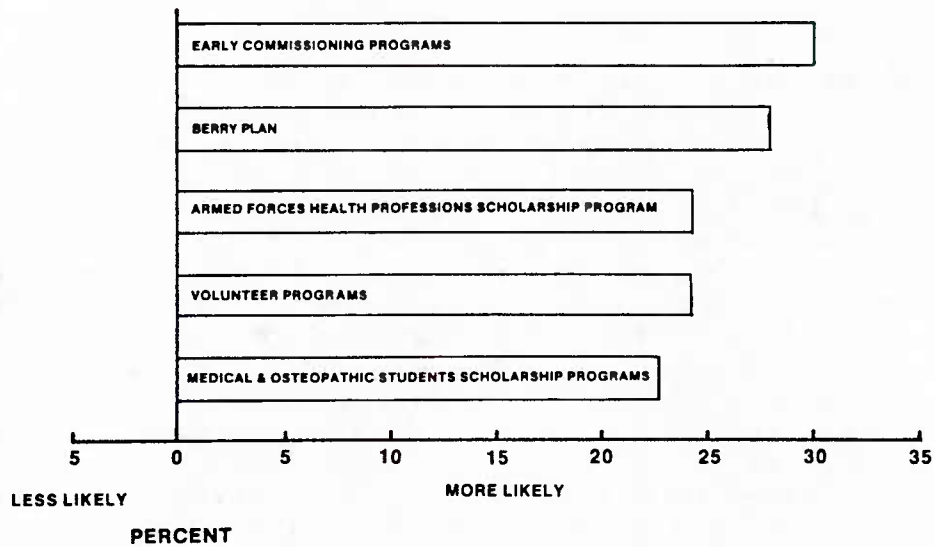


Figure 2. Likelihood of physicians who entered under selected source of entry programs leaving the Navy relative to a comparison group, FY82.

Nevertheless, these results left doubts as to whether source of entry or LOS was the contributing indicator of attrition. Attempts to control for LOS in the model were difficult.¹ However, by the construction of survival curves the results were substantiated. When derived from the product of cross-sectional continuation rates, survival curves suggest the proportion of a cohort of officers expected to remain on board as of particular LOS levels. Survival curves for each source of entry program were compared using the FY82 data. They are displayed in Figure 3. When these curves are compared over common LOS cells, the model's relative results are reproduced. The Medical and Osteopathic Student Scholarship Program (MOSSP) has a significantly higher likelihood of surviving than its counterpart programs. In other words, like the model estimated, at least in FY82, MOSSP officers are least likely to leave (of those officers eligible to leave).

An officer's location in the career path was also felt to contribute to the likelihood of leaving. Two variables were included in the model to test this hypothesis. At least twice in a Navy officer's career the stay or leave decision is particularly critical. The first occurs early in an officer's career when he reaches the end of his obligated service. The second is reached at 20 years of service--the point in the career when an officer is first eligible to retire and receive retirement benefits. For those completing obligated service, the decision must be made whether to leave the Navy immediately or to remain and most likely incur an additional obligation. For physicians eligible to retire, the opportunity exists to stay in the Navy and thereby increase the amount of retirement income they will be eligible to receive or to leave the Navy and receive the minimum possible retirement benefits. Being at either of these career junctures, the end of obligated service or eligible to retire, is expected to increase the probability that a physician will leave the Navy. Results from the estimation of the model indicate that a physician is 25 percent more likely to leave if his or her obligation expires in FY82 than a physician at any other point in the career path. Similarly, a physician who is eligible to retire is 16 percent more likely to leave than a counterpart who is not.

The model also tests whether graduation from a medical school located outside of the United States or Canada significantly affects loss behavior of Navy physicians. Over 15 percent of all practicing physicians in the United States (civilian and military) graduated from a foreign medical school. The results suggest that being a foreign medical school graduate decreases the probability that a physician will leave the Navy by 5 percent. This effect was anticipated since it was believed that for a foreign medical school graduate the Navy provides some degree of job security. Also, if there is professional stigma attached to graduating from a foreign medical school, it may be felt less by Navy physicians than by physicians in the private sector.

Besides practicing medicine in a particular specialty, some physicians possess additional medical-related qualifications, for example, flight surgeon or undersea medicine. These skills are, for the most part, Navy-specific and are not easily transferable to the civilian sector. Since additional training was required to attain these skills, the physician possessing these additional qualifications may be more likely to remain in the Navy. Consequently, holding additional, Navy-specific qualifications was expected to increase the likelihood that a physician would stay in the Navy. It was found that a physician holding additional qualifications is nearly 6 percent less likely to leave

¹Including an interactive term of source of entry combined with LOS in the model was unacceptable. It biased the results by creating a multicollinear condition with other LOS-related variables.

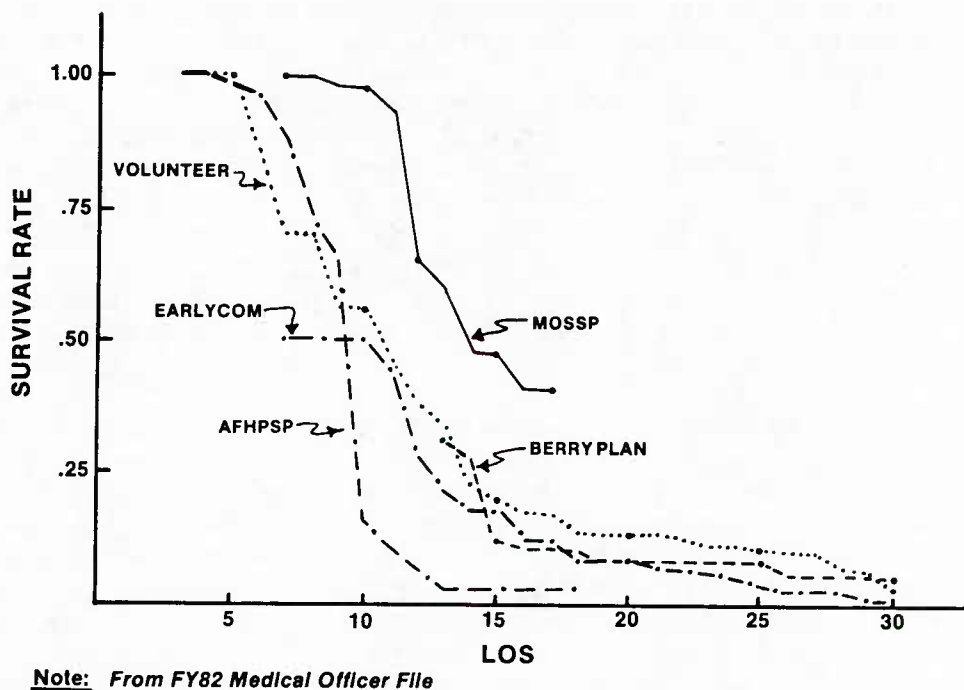


Figure 3. Survival curves of medical source of entry programs.

the Navy than a counterpart who does not possess the additional skills. The insignificance of the difference may suggest that it is a physician's primary specialty and not the additional qualifications that is the dominant indicator of retention.

In FY82, almost 40 percent of Navy physicians were classified as having regular commissions. Of interest was whether a physician's commissioned status, regular or reservist on active duty, significantly affects loss behavior. It was anticipated that a regular commissioned officer would be less likely to leave than a reserve officer. Numerous regular officers entered the Navy as reservists but later accepted a regular commission. Virtually all officers who remain until they are eligible for retirement are regular officers. The estimation results confirmed that, at least for FY82, regular Navy officers are 9 percent less likely to leave than their colleagues who are reserve officers.

Physician's pay exceeds that received by most other Navy officers in comparable pay grades and LOS cells. This is due largely to special pays. One of the stated purposes of implementing the special pays program was to enhance retention; therefore, it is particularly important to consider the effect that military compensation has on the probability of a physician leaving the Navy. The pay measure included in this model is a total military compensation figure; it encompasses regular military compensation (RMC), based on pay grade and LOS, and the maximum amount of special pays that a physician could earn. (See page 7 for a discussion of how special pay amounts were derived.) All of the special pays, with the exception of board certified pay, are considered.

LOS is one of the two determinants of RMC; the other is pay grade. LOS is also crucial to the computation of special pays. Unfortunately, a physician's total military compensation is so heavily dependent on LOS that it is virtually impossible to test the effect of pay without capturing the effect of LOS. This helps to account for the positive effect that pay has on the probability of leaving the Navy. If total military compensation (RMC + special pays) were increased by \$10,000, a 19-percent increase in mean total military compensation, the probability of a physician leaving the Navy would increase by 6 percent. What this seemingly inconsistent result actually suggests is that an increase in LOS, which is reflected as an increase in pay, increases the likelihood that a physician will leave the Navy.

CONCLUSIONS

Any research on medical community retention will be hampered by the shortage of data maintained. The most complete data currently available, the MOF, contain only cross-sectional data. This type of data is not well suited to the development and testing of loss forecasting models. The availability of data for individuals on special pays would eliminate the necessity of imputing pay amounts and would substantially reduce the likelihood of overestimating total military compensation received by physicians.

Despite the data limitations, the results obtained from this effort are important. A physician's specialty plays a significant role in explaining the loss behavior of physicians. The results indicate that those with general medicine as their specialty are the physicians most likely to leave the Navy. Physicians who are approaching the end of their service obligation are much more likely to leave the Navy, as are those who are just eligible to retire, than are other physicians. Source of entry is also an important correlate of loss behavior.

RECOMMENDATIONS

1. Because the civilian market for physicians is well defined and job opportunities are widely publicized, consideration should be given to developing measures of civilian opportunity for inclusion in subsequent models.

2. Further research may suggest some specification of total military compensation that might allow the true effect of military compensation on the probability of leaving the Navy to be measured. Maintenance of the MOF in a manner such that it can be used as a source of time-series data would go a long way toward the realization of a loss forecasting model for the Navy's medical officer community. With suitable historical data, a loss forecasting model for physicians that includes civilian market opportunities, civilian and military physician income, and other factors that fluctuate over time might be developed. It is expected that such a model will provide more accurate loss forecasts than those currently available.

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